

***AMS-8040 Series***

**Antenna Measurement System**

**User Manual**



*AMS-8040 shown with EUT; EUT not included*

 **ETS-LINDGREN®**  
An ESCO Technologies Company

ETS-Lindgren Inc. reserves the right to make changes to any products herein to improve functioning or design. Although the information in this document has been carefully reviewed and is believed to be reliable, ETS-Lindgren does not assume any liability arising out of the application or use of any product or circuit described herein; nor does it convey any license under its patent rights nor the rights of others. All trademarks are the property of their respective owners.

© Copyright 2014–2015 by ETS-Lindgren Inc. All Rights Reserved. No part of this document may be copied by any means without written permission from ETS-Lindgren Inc.

Trademarks used in this document: The *ETS-Lindgren* logo is a registered trademark, and *FlexSorb* and *EMQuest* are trademarks of ETS-Lindgren Inc.

#### Revision Record

##### MANUAL, AMS-8040 SERIES | Part #399383, Rev. B

Revision	Description	Date
A	Initial Release	June, 2014
B	Added AMS-8041 product information; Added <i>EC Declaration of Conformity</i>	April, 2015

# Table of Contents

<b>Notes, Cautions, and Warnings.....</b>	<b>v</b>
<b>1.0 Introduction .....</b>	<b>7</b>
Standard Configuration .....	8
Test Chamber.....	8
2-Axis Positioner .....	9
Antennas .....	10
Ethernet-to-Fiber Optic Converter .....	11
RF Combiner .....	11
Required Items (Not Included) .....	12
Optional Support for Passive Antenna Measurements: AMS-8041 Only....	12
ETS-Lindgren Product Information Bulletin .....	12
<b>2.0 Maintenance .....</b>	<b>13</b>
Flash Upgrading the Motor Base.....	14
Maintenance of Fiber Optics .....	14
Removing and Replacing the Centerpiece Panel .....	15
Removing the Positioner from the Enclosure .....	16
Removing and Replacing the Positioner Top Assembly .....	21
Reset the Motor Base to Zero: For AMS-8040 Only .....	26
Reset the Motor Base to Zero: For AMS-8041 Only .....	31
Replacement and Optional Parts .....	35
Service Procedures .....	35
<b>3.0 Specifications.....</b>	<b>37</b>
Electrical Specifications .....	37
Physical Specifications .....	38
<b>4.0 Operation .....</b>	<b>39</b>
Electrical Requirements .....	39
Connecting Cables to the Connector Panel.....	40
Attaching Handheld Device to the Centerpiece Panel .....	42
<b>5.0 Positioner Command Set .....</b>	<b>43</b>
AXIS2 and AXIS3 .....	43
General Command Structure .....	44
System Commands .....	45

Identification.....	45
Name .....	45
IP Address .....	45
Network Mask .....	45
Trigger Commands .....	46
Temperature Commands .....	47
Temperature Alarm .....	47
Temperature Read Current .....	47
Temperature Set Point.....	47
Axis Commands.....	48
Configure Subset .....	48
Control Subset .....	50
Read Subset.....	51
<b>Appendix A: Warranty .....</b>	<b>53</b>
<b>Appendix B: EC Declaration of Conformity .....</b>	<b>55</b>

## Notes, Cautions, and Warnings

---



**Note:** Denotes helpful information intended to provide tips for better use of the product.



**Caution:** Denotes a hazard. Failure to follow instructions could result in minor personal injury and/or property damage. Included text gives proper procedures.



**Warning:** Denotes a hazard. Failure to follow instructions could result in **SEVERE** personal injury and/or property damage. Included text gives proper procedures.



**Note:** See the ETS-Lindgren *Product Information Bulletin* for safety, regulatory, and other product marking information.

This page intentionally left blank.

## 1.0 Introduction

---

The **ETS-Lindgren AMS-8040 Series Antenna Measurement System** is a compact, fully-anechoic RF enclosure designed for making wireless device over-the-air performance measurements in the 400 MHz to 6 GHz frequency range. The AMS-8040 Series is ideal for:

- Design verification
- Pre-certification testing
- Production sample testing
- Desense testing
- Regression testing



*AMS-8040 shown with EUT;  
EUT not included*

The AMS-8040 Series is designed to provide an environment for relative OTA radiation performance of wireless devices. It can be used to measure approximate EIRP, EIS, or RSSI in a given direction and polarization. These results can be used to compare the behavior of multiple identical devices, or the same device under different conditions, such as external interference or desensitization due to other platform components or radios.

Additionally, the AMS-8041 is capable of performing passive antenna measurements; contact ETS-Lindgren Sales for more information on this option (must be specified at the time of initial purchase).

## Standard Configuration

---

### TEST CHAMBER

As a self-contained, freestanding test chamber, the AMS-8040 Series is an ideal solution when space is limited. Equipped with roller casters, the unit fits through a typical 3-ft x 7-ft door (0.9 m x 2.1 m) and can be moved easily from one test group to another, making it an excellent choice for multiple research and development groups.

The AMS-8040 Series is constructed with the same RF shielding and shielded door technology used in the construction of all ETS-Lindgren full certification wireless test chambers. The RF shielded door uses compressible finger stock in a knife-edge configuration, and two latch points with a single point handle provide secure sealing and one-hand operation. Typical RF isolation of both the shielding and door is greater than 80 dB.

FlexSorb™, a flexible RF absorber that bends and returns to its original form, is designed to eliminate breakage from extended lab use. The absorber is performance optimized and limits reflections and moding for more accurate, repeatable measurements. Tapered wedges line the walls, pyramidal absorber is used on the floor, and lossy foam lines the antenna.

A connector panel provides two SMA connectors and two Type N connectors for DUT input/output, and one BNC connector for triggered acquisition functionality.



## 2-AXIS POSITIONER

The AMS-8040 Series includes a unique, light duty 2-axis positioner to enable 3D antenna pattern measurements. The positioner is constructed of primarily low-dielectric materials, and is designed for the following:

- **AMS-8040 positioner:** Handheld devices weighing up to 1 lb (0.45 kg).
- **AMS-8041 positioner:** Handheld devices weighing up to 2.2 lb (1.0 kg).

The positioner is controlled over Ethernet by ETS-Lindgren EMQuest™ EMQ-100 Antenna Measurement Software or by customer-written software installed on a control computer. The control signal is passed from the test chamber over fiber optics, and is converted to Ethernet via an Ethernet-to-fiber optic converter (included) at the control computer.



**Note:** Varieties of test packages are available; contact ETS-Lindgren for information.

## ANTENNAS



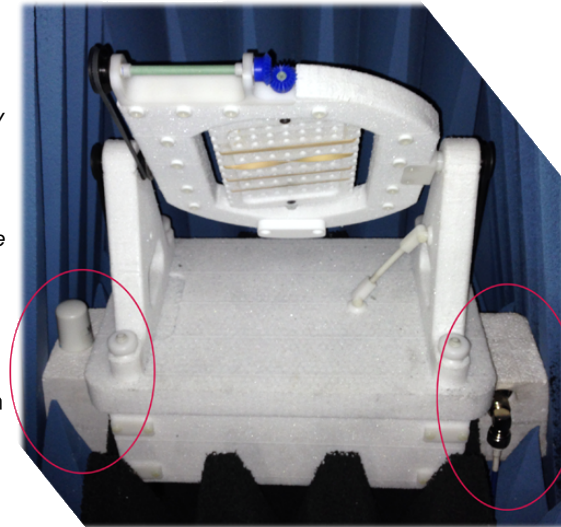
**Note:** RF cabling for the measurement and communication antennas is included; the cables are installed inside the test chamber, from each antenna to the connector panel.

These ETS-Lindgren antennas are mounted in the test chamber:

- **(1) 3165-02 Dual-Polarized Dual-Vivaldi Array Antenna**—For linear and circular measurements. The 3165-02 is mounted to the removable access panel located at the top of the enclosure.
- **(2) Communication Antennas**—Two antennas are used for communication with the equipment under test (EUT). Inside the AMS-8040 enclosure, one is mounted vertically and one is mounted horizontally; inside the AMS-8041 enclosure, both are mounted horizontally. Each antenna has a frequency range of 690 MHz to 6 GHz.

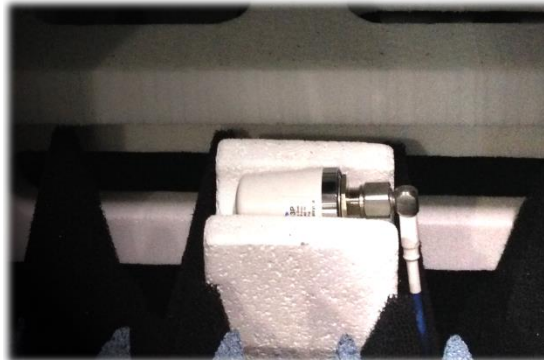
*In the AMS-8040 enclosure, one communication antenna is mounted vertically to one side of the positioner, and the other is mounted horizontally on the other side*

Vertically-mounted communication antenna



Horizontally-mounted communication antenna

*In the AMS-8041 enclosure, one communication antenna is mounted horizontally in front of the positioner (shown), and the other is mounted horizontally behind the positioner (not shown).*



In a typical usage case, the communication antennas are connected to the test instrumentation using the included RF combiner (RF cables not included). For more information, see *Connecting Cables to the Connector Panel* on page 40.

### **ETHERNET-TO-FIBER OPTIC CONVERTER**

An Ethernet-to-fiber optic converter and a fiber optic control cable that connects the control computer to the positioner via the converter are included with the AMS-8040 Series. For other cabling, see *RF and Other Cables* on page 12.

### **RF COMBINER**

An RF combiner is included with the AMS-8040 Series. The included RF cables are connected from the communication antennas to the connector panel. Customer-provided RF cables will connect the communication antennas to the RF combiner, and the RF combiner to the test instrumentation. For an illustration, see *Connecting Cables to the Connector Panel* page 40.

## Required Items (Not Included)

---



**Note:** For ordering information, see *Replacement and Optional Parts* on page 31.

- Control computer installed with EMQuest EMQ-100 or customer-written software.
- ETS-Lindgren Model 3126 Series Sleeve Dipole Antenna for range calibration (a dipole antenna is included with purchase of an optional test package).
- RF and other cables required to perform any additional testing (additional cabling is included with purchase of an optional test package).

## Optional Support for Passive Antenna Measurements: AMS-8041 Only

---

The AMS-8041 can be configured to support passive antenna measurements of handheld devices weighing up to 2.2 lb (1.0 kg); this option must be specified at the time of initial purchase of the AMS-8041. For more information, contact ETS-Lindgren Sales.

## ETS-Lindgren Product Information Bulletin

---

See the ETS-Lindgren *Product Information Bulletin* included with your shipment for the following:

- Warranty information
- Safety, regulatory, and other product marking information
- Steps to receive your shipment
- Steps to return a component for service
- ETS-Lindgren calibration service
- ETS-Lindgren contact information

## 2.0 Maintenance

---



**CAUTION:** Before performing any maintenance, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.



**WARNING:** Maintenance of the AMS-8040 Series is limited to components external to the test chamber, such as cables or connectors, and to the information provided in this section.



Clean the exterior of the cabinet using a damp cloth and mild cleaner. Always unplug the unit before cleaning.



**CAUTION:** Other than the centerpiece panel, do not touch the foam parts of the positioner. Skin oils and other debris can damage and discolor the foam.



**CAUTION: ONLY QUALIFIED SERVICE PERSONNEL** should remove or replace the positioner from the test chamber. The positioner is a precise, delicate component, and any attempt to remove and replace it may damage it.



**Note:** If you have any questions concerning maintenance, contact ETS-Lindgren Customer Service.

## Flash Upgrading the Motor Base

---

The fiber optic interface and motor base control boards support flash upgrades to firmware and programmable logic. As revisions become available, both the firmware and upgrade utility will be available for download from [www.ets-lindgren.com/softwareupdates](http://www.ets-lindgren.com/softwareupdates). It is the responsibility of the customer to periodically check the ETS-Lindgren website for revisions, and to download and install them.

## Maintenance of Fiber Optics

---

Fiber optic connectors and cables can be damaged from airborne particles, humidity and moisture, oils from the human body, and debris from the connectors they plug into. Always handle connectors and cables with care, using the following guidelines.



**CAUTION:** Before performing any maintenance, disconnect the fiber optic cables from the unit and turn off power.

**When disconnecting fiber optic cables, apply the included dust caps to the ends to maintain their integrity.**

**Before connecting fiber optic cables, clean the connector tips and in-line connectors.**

**Before attaching in-line connectors, clean them with moisture-free compressed air.**

**Failure to perform these tasks may result in damage to the fiber optic connectors or cables.**

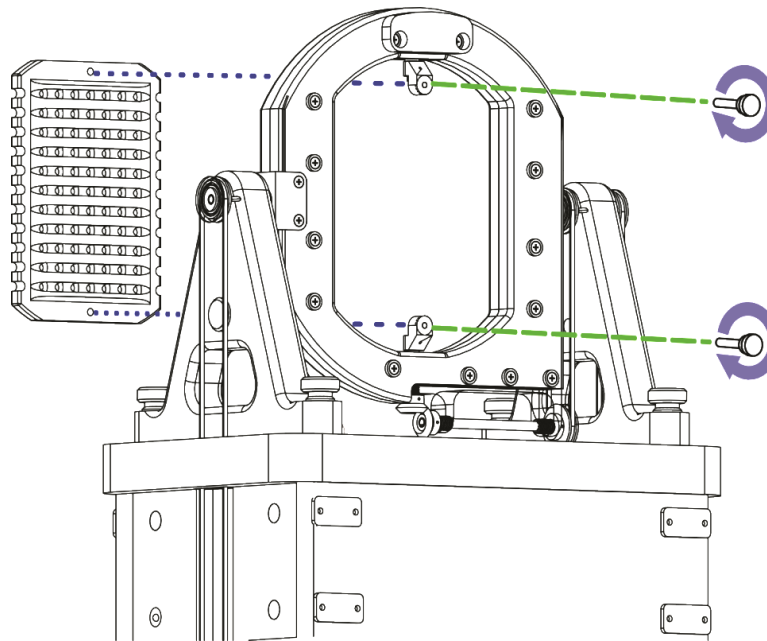
## Removing and Replacing the Centerpiece Panel



**Note:** Only the centerpiece panel in the top assembly of the positioner can be replaced. If another component in the top assembly is damaged, the entire top assembly must be replaced. See page 31 for information on ordering a replacement top assembly.



**Note:** It is not necessary to remove the positioner from the enclosure to remove and replace the centerpiece panel.



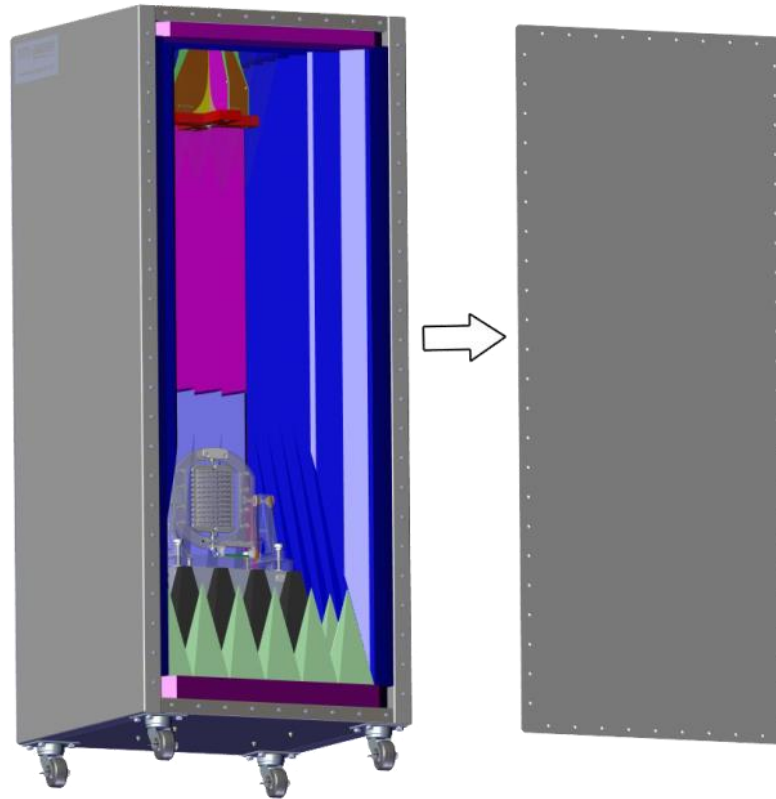
*(Shown: AMS-8040 positioner - outside enclosure)*

1. Using your fingers, remove the two plastic thumbscrews that attach the centerpiece panel to the positioner.
2. Remove the centerpiece panel.
3. Attach the new centerpiece panel to the positioner by replacing the two thumbscrews removed in step 1.

## Removing the Positioner from the Enclosure



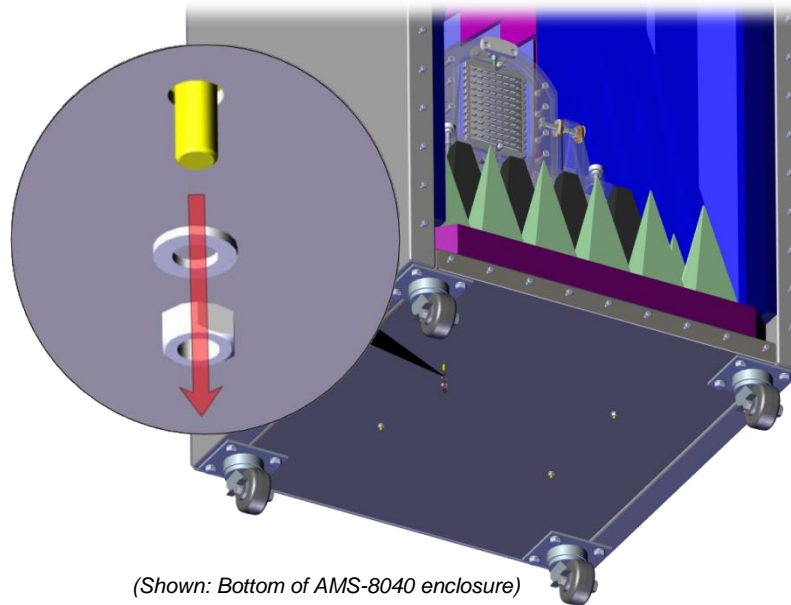
**Note:** To reinstall the positioner in the enclosure, reverse these steps, starting with step 6 and finishing at step 1.



*(Shown: Panel removed from back of AMS-8040 enclosure)*

- 1. Remove the bolts that attach the back panel to the enclosure.**  
Remove all but two of the bolts at the top of the panel and have a team member hold the panel in place when removing the last two bolts.
- 2. Remove panel.**





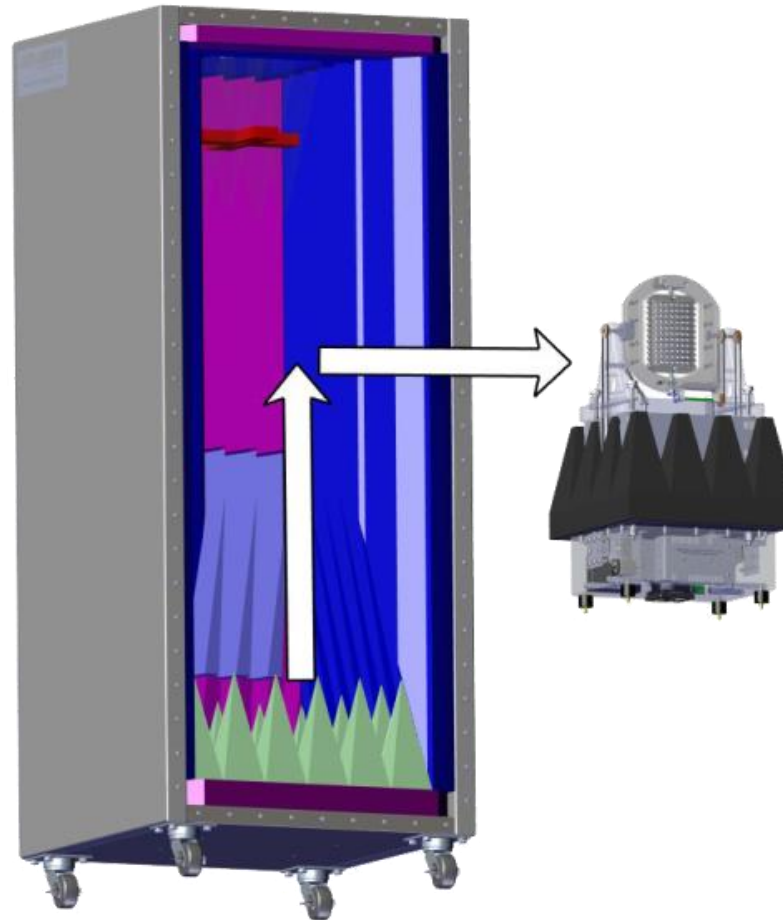
*(Shown: Bottom of AMS-8040 enclosure)*

- 3. Remove four bolts and washers from bottom of the enclosure.**  
From the bottom of the enclosure remove the four bolts and washers that fit over the post at the bottom of each foot on the positioner; these hold the positioner in place.



*(Shown: AMS-8040 positioner - outside enclosure)*

4. **Disconnect power and fiber optic cables.** On the inside of the enclosure disconnect the power cable and the fiber optic cables from the positioner.

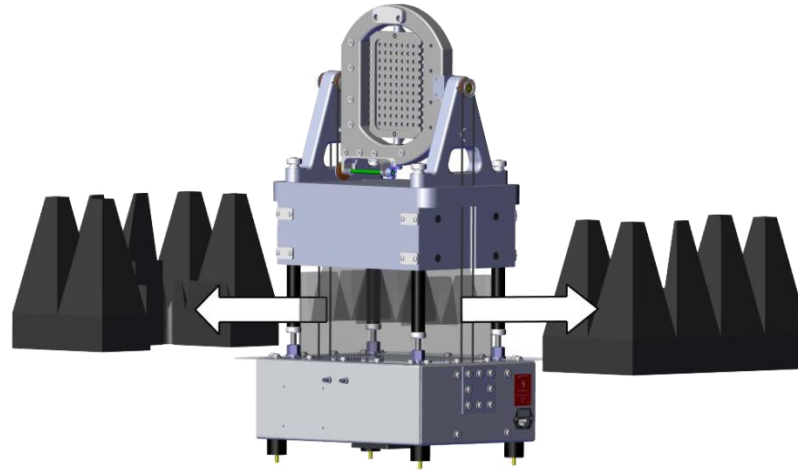


*(Shown: AMS-8040 positioner removal from enclosure)*

- 5. Remove positioner from enclosure.** With help from a team member, carefully lift the positioner and remove it from the enclosure.



**Note:** When reinstalling the positioner in the enclosure, ensure that the peg at the bottom of each foot on the positioner fits into the four holes at the bottom of the enclosure; see step 3 on page 17 or more information.



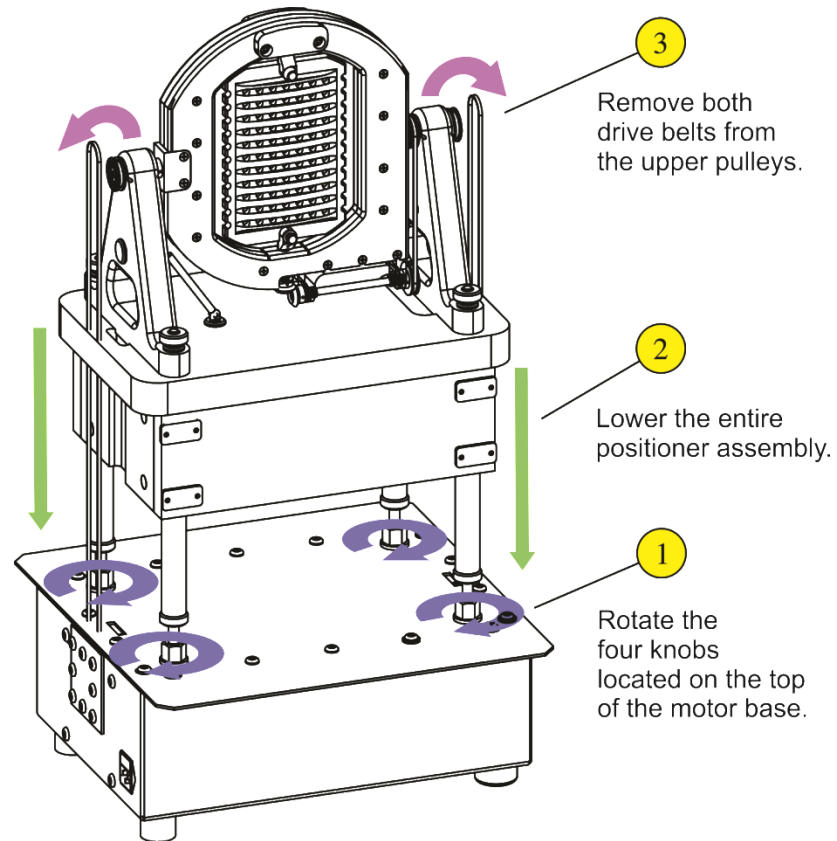
*(Shown: AMS-8040 positioner - outside enclosure)*

6. **Remove absorber from positioner.** Remove the two halves of absorber from the positioner.

## Removing and Replacing the Positioner Top Assembly



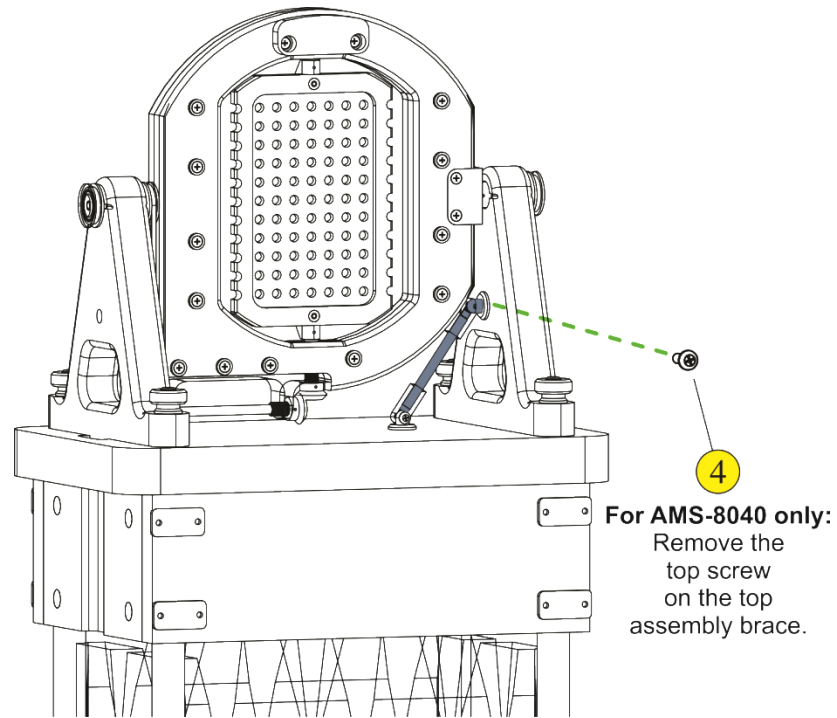
**Note:** Before replacing the top assembly, follow the steps on page 16 to remove the positioner from the enclosure.



*(Shown: AMS-8040 positioner - outside enclosure)*

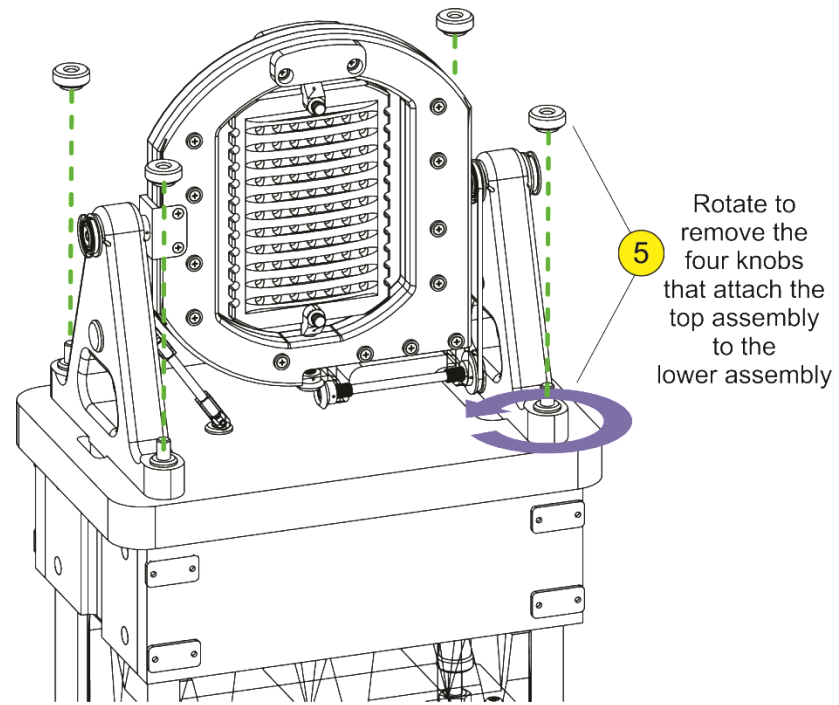


**Note:** Step 4 is for an AMS-8040 positioner only; skip for an AMS-8041 positioner.



**For AMS-8040 only:**  
Remove the  
top screw  
on the top  
assembly brace.

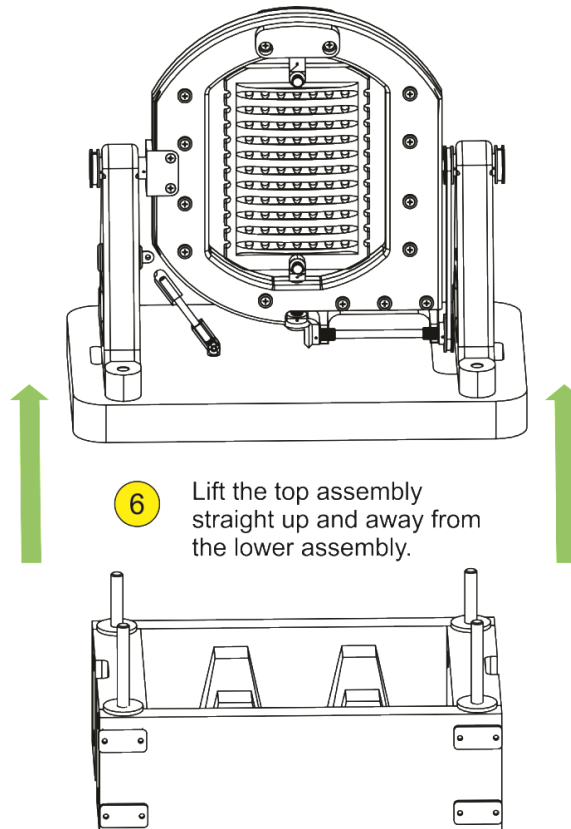
*(Shown: AMS-8040 positioner - outside enclosure)*



*(Shown: AMS-8040 positioner - outside enclosure)*



**Note:** Step 8 is for an AMS-8040 positioner only; skip for an AMS-8041 positioner.



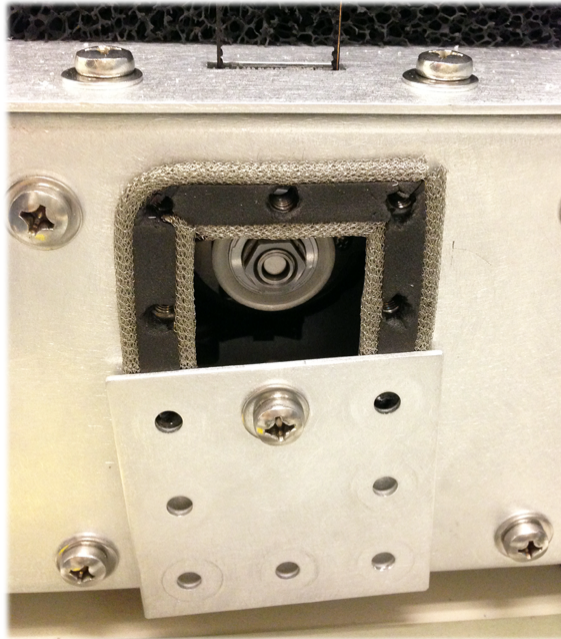
**6** Lift the top assembly straight up and away from the lower assembly.

**7** Place the new top assembly on top of the lower assembly.

**8** **For AMS-8040 only:**  
Replace the brace screw removed in step 4.

**9** Replace the four knobs removed in step 5 to attach the top assembly to the lower assembly.





*AMS-8040 motor base*

- 10 Replace the drive belts removed in step 3 onto the upper pulleys.

**For AMS-8040 only:** To make sure the belts are secure around the lower pulleys, remove the two end plates to provide access to the lower pulleys. Do not replace the two end plates until you reset the motor base to zero; you will need access to the lower pulleys.

Gradually rotate the four knobs located on top of the motor base to raise the entire positioner assembly, adjusting the belts as required.



**Note:** After replacing the top assembly you must reset the motor base to zero.

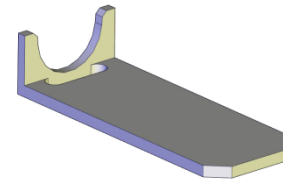
- **For AMS-8040 instructions,** see page 26.
- **For AMS-8041 instructions,** see page 31.

## Reset the Motor Base to Zero: For AMS-8040 Only

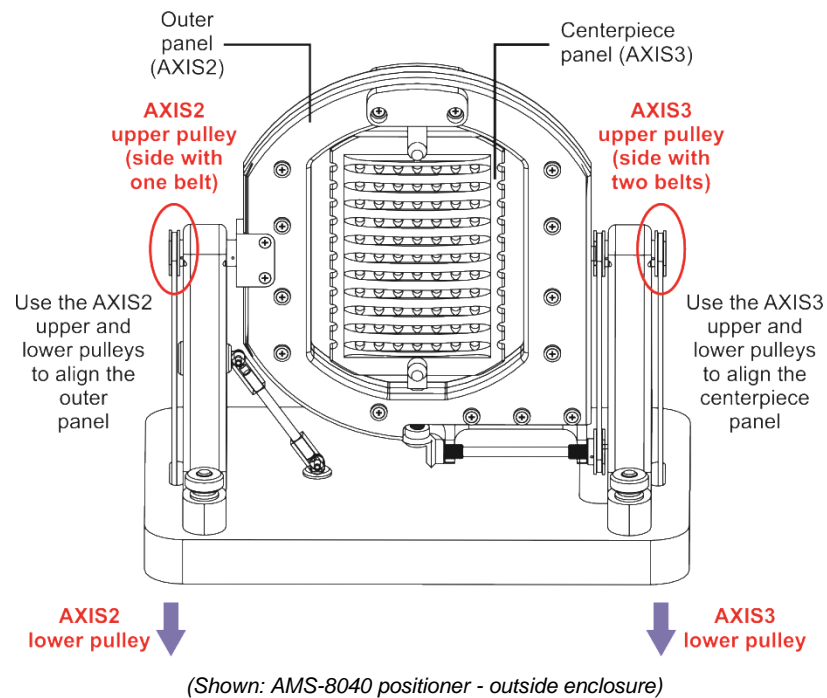


**Note:** After replacing the top assembly you must reset the motor base to zero.

You will use the pulley clamp that shipped with the AMS-8040 to reset the motor base to zero. The pulley clamp is shipped attached to the outside of the motor base.

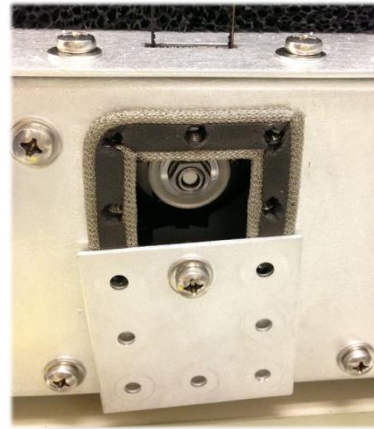


*Pulley clamp for  
AMS-8040 positioner*



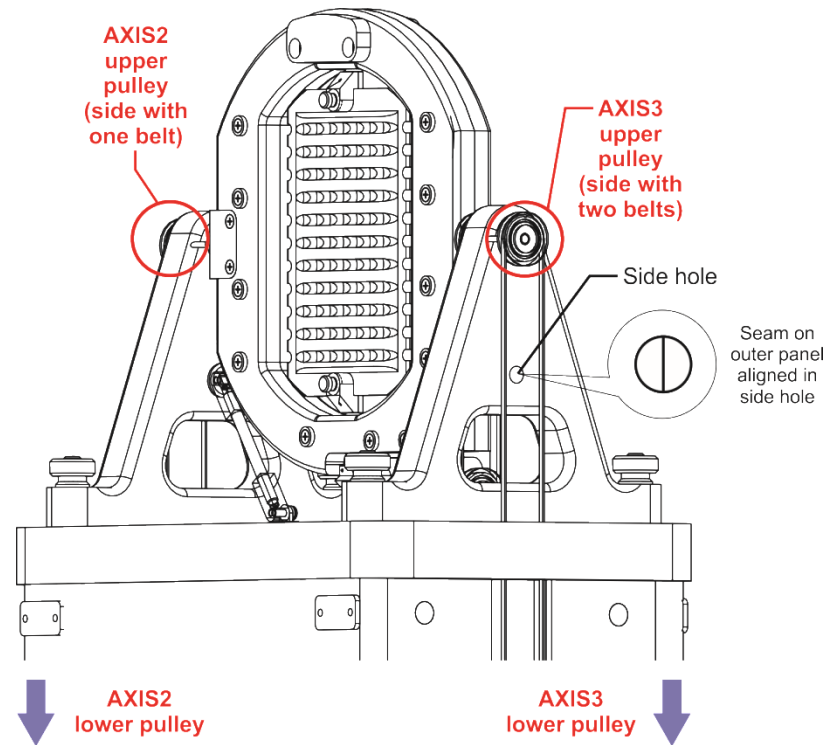
1. **Home each panel**—Via EMQuest™ EMQ-100 Antenna Measurement Software or the **Home** command using customer-written software installed on a control computer.
  - Home the outer panel/AXIS2, and then wait for the home process to complete.
  - Home the centerpiece panel/AXIS3, and then wait for the home process to complete.

2. If in place, remove the two end plates on the motor base to provide access to the lower pulleys.



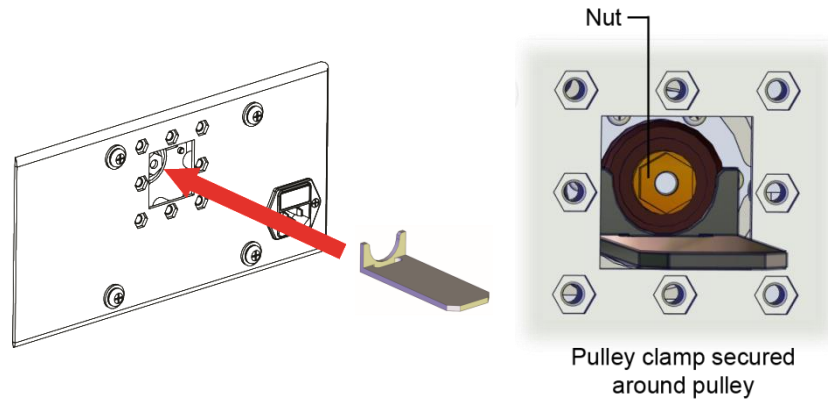
*AMS-8040 motor base*

3. Align the outer panel/AXIS2.



(Shown: AMS-8040 positioner - outside enclosure)

- Look through the hole in the side of the top assembly where the two belts are located. If the seam on the outer panel is aligned in the center of the side hole, go to step 4; otherwise, continue here.



- Secure the pulley clamp around the AXIS2 lower pulley. This will hold the pulley in place.
- Loosen the nut on the AXIS2 lower pulley.
- Remove the pulley clamp from around the AXIS2 lower pulley.
- Rotate the AXIS2 upper pulley by hand to move the outer panel and align the seam in the center of the side hole.
- When the seam is aligned, tighten the nut on the AXIS2 lower pulley, being careful not to move the outer panel.

If the outer panel moves, repeat these steps until the nut is tightened and the seam is aligned in the side hole.

**4. Align the centerpiece panel/AXIS3.**

- Secure the pulley clamp around the AXIS3 lower pulley. This will hold the pulley in place.
- Loosen the nut on the AXIS3 lower pulley.
- Remove the pulley clamp from around the AXIS3 lower pulley.
- Rotate the AXIS3 upper pulley by hand to move the centerpiece panel and align it with the outer panel. The centerpiece panel should be parallel with the outer panel.
- When the centerpiece panel is parallel with the outer panel, tighten the nut on the AXIS3 lower pulley, being careful not to move the centerpiece panel.

If the centerpiece panel moves, repeat these steps until the nut is tightened and the centerpiece panel is parallel with the outer panel.

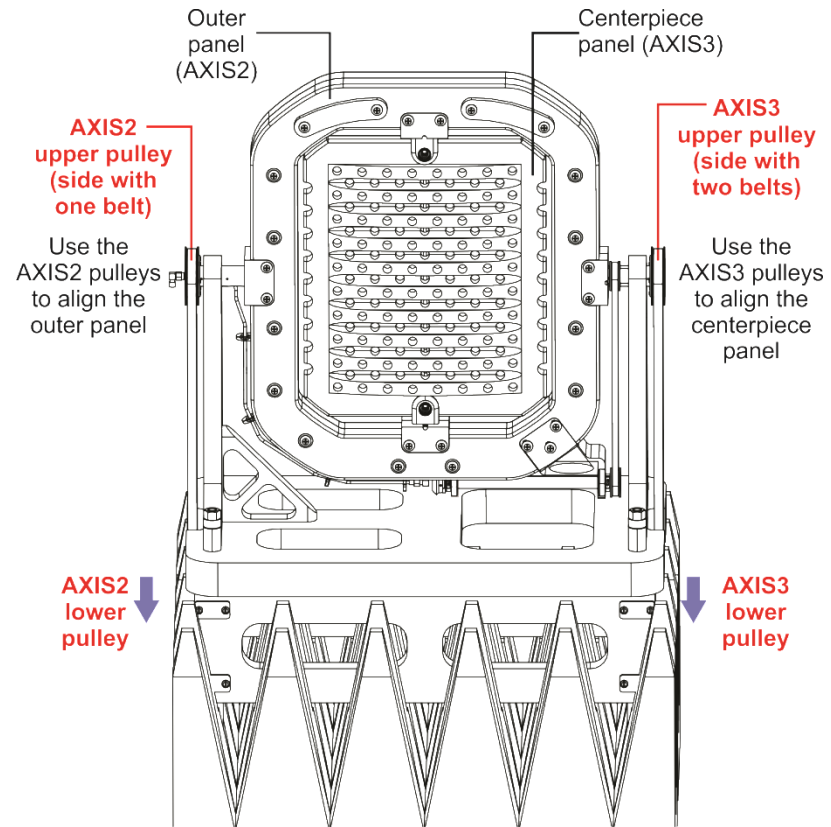
**5. Replace the two end plates on the motor base.**

- 6. Reinstall the positioner in the enclosure.** To reinstall the positioner in the enclosure reverse the steps on page 16, starting with step 6 and finishing at step 1.

## Reset the Motor Base to Zero: For AMS-8041 Only



**Note:** After replacing the top assembly you must reset the motor base to zero.

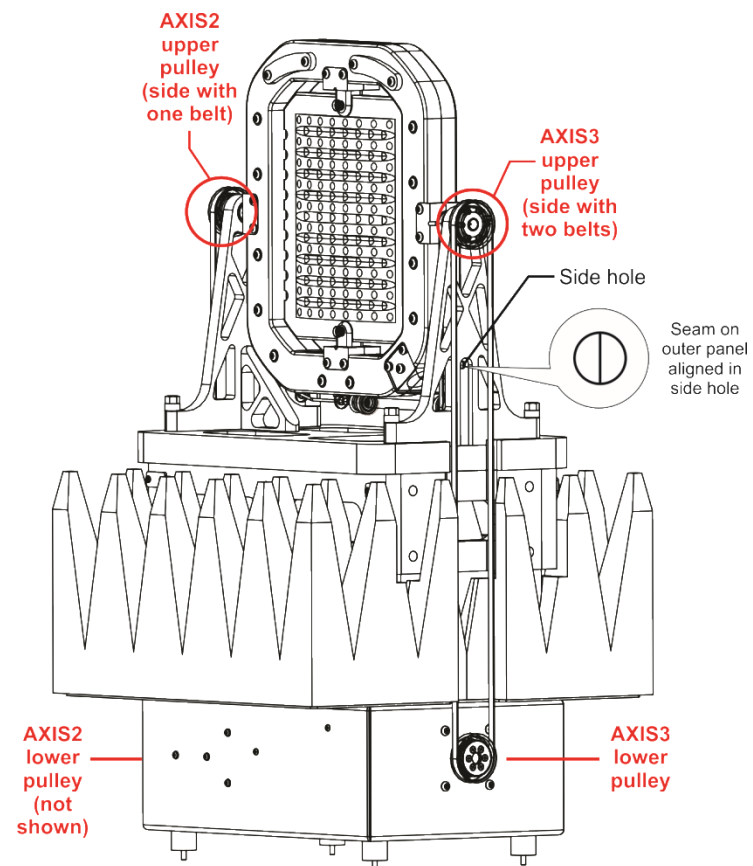


(Shown: AMS-8041 positioner - outside enclosure)

1. **Home each panel**—Via EMQuest™ EMQ-100 Antenna Measurement Software or the **Home** command using customer-written software installed on a control computer.

- Home the outer panel/AXIS2, and then wait for the home process to complete.
- Home the centerpiece panel/AXIS3, and then wait for the home process to complete.

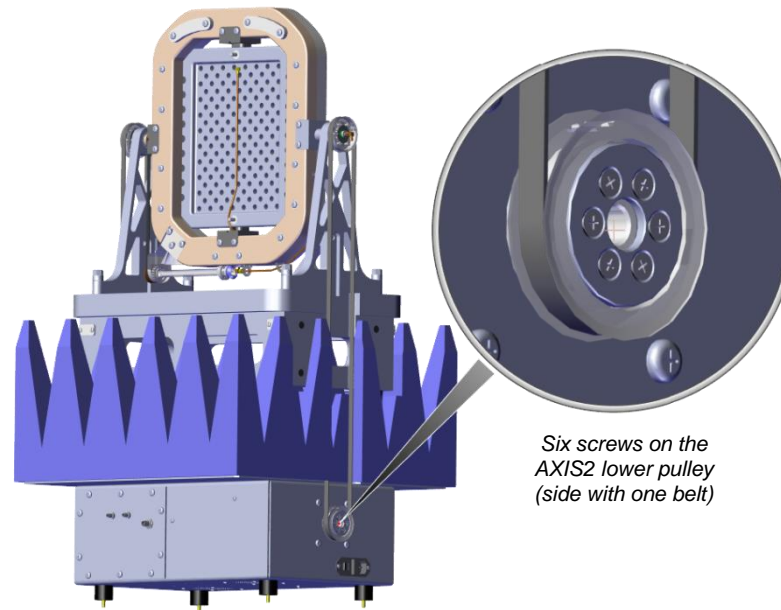
2. **Align the outer panel/AXIS2.**



(Shown: AMS-8041 positioner - outside enclosure)



- Look through the hole in the side of the top assembly where the two belts are located. If the seam on the outer panel is aligned in the center of the side hole, go to step 3; otherwise, continue here.



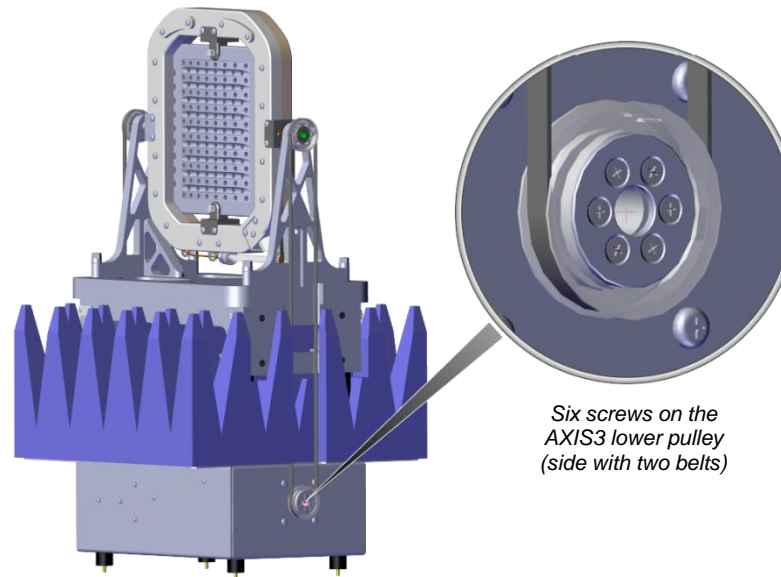
*Six screws on the  
AXIS2 lower pulley  
(side with one belt)*

*(Shown: AMS-8041 positioner - outside enclosure)*

- Loosen the six screws on the AXIS2 lower pulley.
- Rotate the AXIS2 lower pulley by hand to move the outer panel and align the seam in the center of the side hole.
- When the seam is aligned, re-tighten the six screws on the AXIS2 lower pulley, being careful not to move the outer panel.

If the outer panel moves, repeat these steps until the six screws are tightened and the seam is aligned in the side hole.

### 3. Align the centerpiece panel/AXIS3.



*(Shown: AMS-8041 positioner - outside enclosure)*

- Loosen the six screws on the AXIS3 lower pulley.
- Rotate the AXIS3 lower pulley by hand to move the centerpiece panel and align it with the outer panel. The centerpiece panel should be parallel with the outer panel.
- When the centerpiece panel is parallel with the outer panel, re-tighten the six screws on the AXIS3 lower pulley, being careful not to move the centerpiece panel.

If the centerpiece panel moves, repeat these steps until the six screws are tightened and the centerpiece panel is parallel with the outer panel.

4. **Reinstall the positioner in the enclosure.** To reinstall the positioner in the enclosure reverse the steps on page 16, starting with step 6 and finishing at step 1.

## Replacement and Optional Parts

---



**Note:** ETS-Lindgren may substitute a similar part or new part number with the same functionality for another part/part number. Contact ETS-Lindgren for questions about part numbers and ordering parts.

Following are the part numbers for ordering replacement or optional parts for the AMS-8040 Series Antenna Measurement System.

Part Description	Part Number	
	AMS-8040	AMS-8041
Centerpiece Panel	120512	119586
Top Assembly	120513	Contact ETS-Lindgren for ordering information
Fiber Optic-to-Ethernet Converter	708043	
RF Combiner	690142	
Communication Antenna	705594	
Range Calibration Fixture	120700	

## Service Procedures

---

For the steps to return a system or system component to ETS-Lindgren for service, see the *Product Information Bulletin* included with your shipment.

This page intentionally left blank.

### 3.0 Specifications

#### Electrical Specifications

<b>Frequency Range:</b>	400 MHz—6 GHz
<b>Path Length:</b>	<ul style="list-style-type: none"><li>• <b>AMS-8040:</b> 1m (nominal)</li><li>• <b>AMS-8041:</b> 80 cm</li></ul>
<b>Connectors:</b>	<ul style="list-style-type: none"><li>• (2) ST/Fiber Optic – for Ethernet-to-fiber optic converter</li><li>• (2) SMA - for DUT</li><li>• (2) Type N - for DUT (two are used for the communication antennas)</li><li>• (1) BNC connector – for triggered acquisition functionality</li><li>• (1) IEC - for power input</li></ul>
<b>Filter:</b>	Dual-line 10-amp 60 Hz power line filter
<b>Power Requirements:</b>	<p><b>Positioner and Filter</b></p> <ul style="list-style-type: none"><li>• 200–230 VAC</li><li>• 50/60 Hz</li><li>• 10A</li></ul> <p><b>Ethernet-to-Fiber Optic Converter</b></p> <ul style="list-style-type: none"><li>• 100–240 VAC</li><li>• 50/60 Hz</li><li>• 0.6A</li></ul>

## Physical Specifications

	AMS-8040	AMS-8041
<b>Test Chamber Dimensions (External):</b>		
<b>Width:</b>	74.9 cm (29.49 in)	87.4 cm (34.4 in)
<b>Height:</b>	194.3 cm (76.49 in)	201.4 cm (79.3 in)
<b>Depth:</b>	86.4 cm (34.0 in)	101.1 cm (38.9 in)
<b>Door/Clear Opening Dimension:</b>	48.3 cm x 48.3 cm (19 in x 19 in)	
<b>Weight (Nominal):</b>	238 kg (525 lb)	261.3 kg (575.0 lb)

## 4.0 Operation

---



**CAUTION:** Before placing into operation, follow the safety information in the ETS-Lindgren *Product Information Bulletin* included with your shipment.



**CAUTION:** Do not attempt to remove the positioner from the test chamber. The positioner is a precise, delicate component, and any attempt to remove and replace it may damage it.



**CAUTION: ONLY QUALIFIED SERVICE PERSONNEL** should remove or replace the positioner from the test chamber. The positioner is a precise, delicate component, and any attempt to remove and replace it may damage it.



**Note:** The test chamber is designed for use only with the 2-axis positioner.



**Note:** For information on using EMQuest to operate the positioner, see the help file included with the EMQuest software.

### Electrical Requirements

---

Provide power within five feet of the location where the AMS-8040 Series Antenna Measurement System will be located. For power specifications, see *Power Requirements* on page 37.

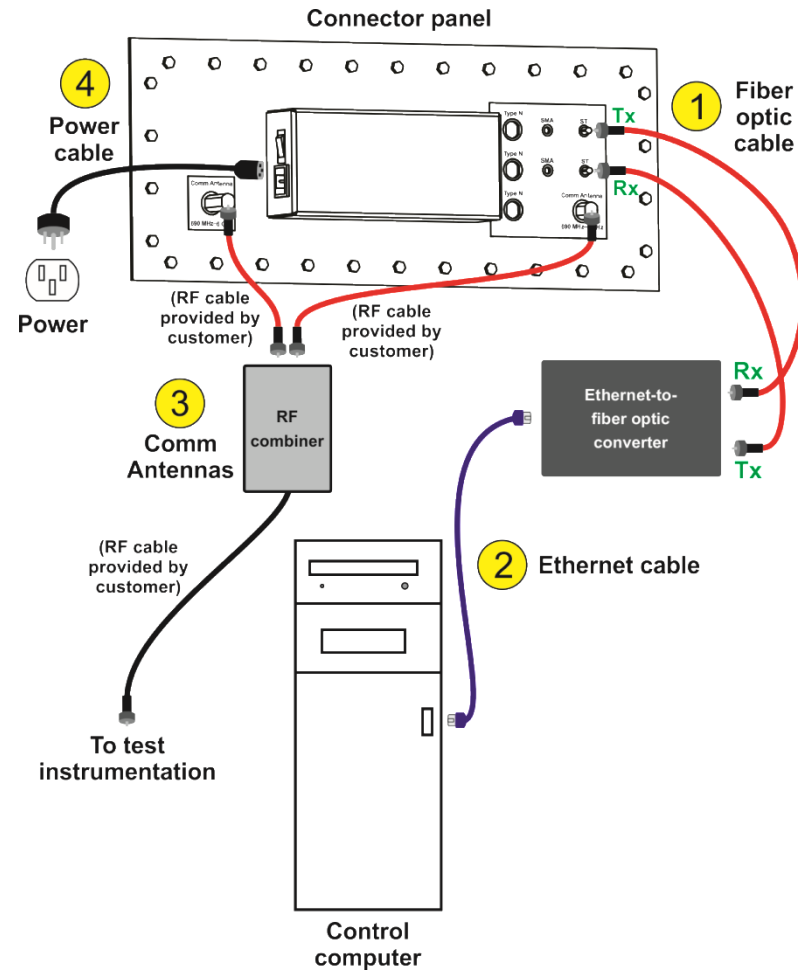
## Connecting Cables to the Connector Panel



**Caution:** Make sure the filter power switch located on the front connector panel is set to OFF before connecting any cables to the AMS-8040 Series.



**Note:** For information on the proper handling of fiber optic cables and connectors, see *Maintenance of Fiber Optics* on page 14.





1. Plug one end of the fiber optic cable into the transmit (**Tx**) and receive (**Rx**) connectors on the front connector panel.

Plug the other ends of the fiber optic cable into the transmit and receive connectors on the Ethernet-to-fiber optic converter.

2. Plug one end of the Ethernet cable into the Ethernet connector on the Ethernet-to-fiber optic converter.

Plug the other end of the Ethernet cable into the Ethernet connector on the control computer.



**Note:** For information on required power source, see *Electrical Requirements* on page 39.

3. Plug one end of each of the communication antenna cables into the **Comm Antenna** connectors on the front connector panel.

Use two RF cables (customer-provided) to connect the communication antennas from the connector panel to the RF combiner.

Use one RF cable (customer-provided) to connect the RF combiner to the test instrumentation.

4. Plug one end of the power cable into the filter power connector on the front connector panel.

Plug the other end of the power cable into the power source.



**Note:** After all cables are properly connected, set the filter power switch located on the front connector panel to ON to power up the AMS-8040 Series.

## **Attaching Handheld Device to the Centerpiece Panel**

---



**Note:** To avoid damage to the positioner, remove the centerpiece panel from the positioner and the test chamber before attaching the handheld device. For the steps to remove and replace the centerpiece panel, see page 15.

The centerpiece panel on the positioner holds the handheld device. Remove the centerpiece panel and attach the handheld device to the panel with the included rubber bands, and then re-attach the panel to the positioner.

## 5.0 Positioner Command Set

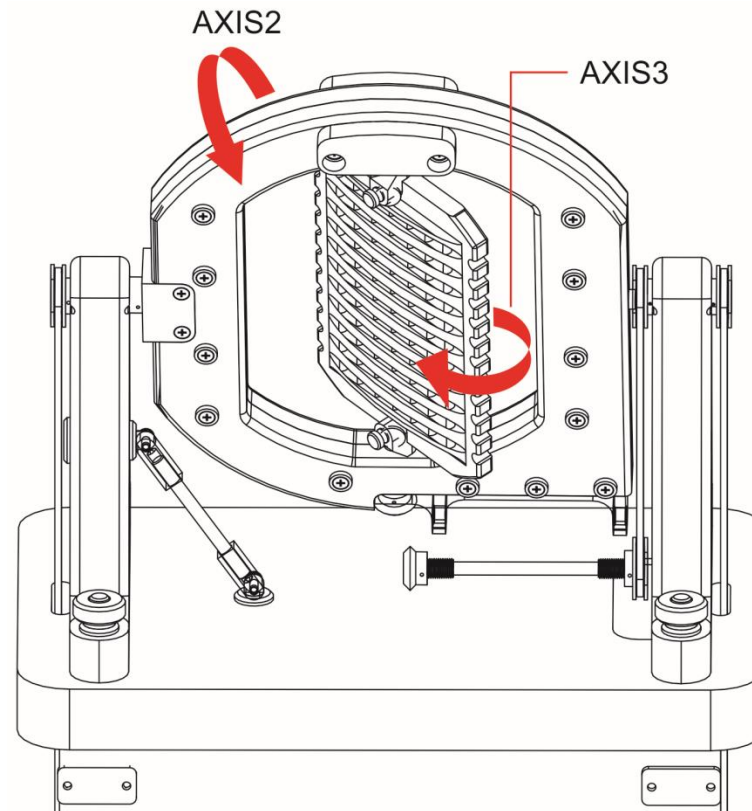
---

When used properly, the following commands enable programmers to develop powerful applications that can handle almost any condition the positioner may encounter.

### AXIS2 and AXIS3

---

The axes of the positioner are numbered AXIS2 and AXIS3 as follows:



## General Command Structure

---

Most of the following commands use this general structure:

```
[SUBSET:]AXIS<n[-m]>:COMMAND <argument_n>[,<argument_m>]
```

### Where:

[ ]	Indicates optional.
< >	Indicates required.
COMMAND	The backwards-compatible Model 2090 Multi-Device Controller command.  When used by itself, controls the first device in a multi-axis system, and, when arguments are required, supports only a single argument.
The command prefix in optional brackets [ ]	Required to access a specific axis or multiple axes at a time.
SUBSET	The particular command grouping subset (e.g. configure, control, etc.).
AXIS<n[-m]>	Selects the desired axis or axes to control.  A single index specifies a single axis (e.g. <code>AXIS2</code> or <code>AXIS3</code> ) with a single argument, while a range (e.g. <code>AXIS2-3</code> ) specifies a range of axes with a corresponding range of arguments.  Note that some commands only support single-axis control.
<argument_n>	The single argument required for a single-axis command.
[,<argument_m>]	Represents the additional arguments required for an optional multi-axis command (e.g. <code>SUBSET:AXIS2-3:COMMAND 2,3</code> ).

## System Commands

---

### IDENTIFICATION

Command Format: **\*IDN?**

Response: **ETS-Lindgren Inc., System Name,  
Module Name, HW x.xx FW x.xx**

Default IP Address: **192.168.0.100 Port 1206**

### NAME

Command Format: **MODule:NAME** <Module Name>

Query Format: **MODule:NAME?**

Response: **Module Name**

### IP ADDRESS

Command Format: **MODule:IPADdress** <nnn.nnn.nnn.nnn>

Query Format: **MODule:IPADdress?**

Response: **nnn.nnn.nnn.nnn**

### NETWORK MASK

Command Format: **MODule:NETMask** <nnn.nnn.nnn.nnn>

Query Format: **MODule:NETMask?**

Response: **nnn.nnn.nnn.nnn**

Default Mask: **255.255.255.0**

## Trigger Commands

---

Configuration Query: **TRIG?**

Enable/Disable: **TRIG**

### Format:

```
TRIG <ON/OFF>Step Size, Reference Position,  
Pre-Trigger Delay, Trigger Pulse Length, Post-Trigger Delay,  
<HIGH/LOW>
```

### Where:

Step Size: Angular distance between trigger pulses in degrees.

Reference Position: One of the positions where a trigger should occur (not necessarily a starting position).

Pre-Trigger Delay: Time between reaching the target encoder position and producing a trigger pulse.

Trigger Pulse Length: Active period of the trigger pulse.

Post Trigger Delay: Minimum inactive period after the trigger pulse before another trigger event can occur.

High/Low: Sets the polarity of the trigger signal.

## Temperature Commands

---



**Note:** Temperature values are in Celsius.

### TEMPERATURE ALARM

When the circuit senses a temperature above this threshold it will soft stop the motors and set the fan to run at full speed (4500 RPM) until the system error is read. *Soft stop* means that the motors will decelerate until full stop; this can take up to 3 seconds depending on current acceleration settings.

Command Format: **TEMP**erature:**ALARM** <value>

Query Format: **TEMP**erature:**ALARM**?

### TEMPERATURE READ CURRENT

Reads the current temperature inside the positioner.

Query Format: **TEMP**erature:**READ**?

### TEMPERATURE SET POINT

The temperature control system will keep the internal temperature at this set point value by increasing or decreasing the fan speed.

Command Format: **TEMP**erature:**SETPoint** <value>

Query Format: **TEMP**erature:**SETPoint**?

## Axis Commands

---

### CONFIGURE SUBSET

#### Set/Query **lower limit**

AXIS<n[-m]>:**CLimit** <limit\_n>[,<limit\_m>]

AXIS<n[-m]>:**LLimit** <limit\_n>[,<limit\_m>]

#### Set/Query **upper limit**

AXIS<n[-m]>:**ULimit** <limit\_n>[,<limit\_m>]

AXIS<n[-m]>:**WLimit** <limit\_n>[,<limit\_m>]

#### Set/Query **current position**

AXIS<n[-m]>:**CPosition** <position\_n>[,<position\_m>]

#### Set/Query **continuous rotation** (ignore soft limits)

AXIS<n[-m]>:**CRotation**

#### Set **non continuous mode** (restrict motion between upper and lower limits)

AXIS<n[-m]>:**NCRotation**

#### Set/Query **acceleration** in seconds

AXIS<n[-m]>:**ACCEleration** <acceleration> [s]

#### Set/Query **acceleration** in milliseconds

AXIS<n[-m]>:**A** <acceleration> [ms]



#### Set preset **speed**

AXIS<n[-m]>:<SS# speed>[,<SS# speed>]

- |         |  |
|---------|--|
| #       | A value from 1–8 to select the preset speed register to set.   |
| <speed> | Value from 0–255 representing the desired speed setting for the specified speed selection. A value of 0 represents the minimum available speed of the device, and a value of 255 represents the maximum. The actual speed of the device is given approximately by the formula: |

$$\text{Actual Speed} = \text{<speed>} (\text{MaxSpeed} - \text{MinSpeed}) / 255 + \text{MinSpeed}$$

#### Set query a preset **speed** setting for a variable speed device

AXIS<n[-m]>:SS#?

- |           |  |
|-----------|--|
| #         | A value from 1–8 to select the preset speed register to query. (Firmware revisions prior to v3.00 only support 4 speed settings.)<br><br>Note: There can be no white space between the command, the number, and the question mark. |
| Response: | <speed setting><br><br>Value between 0 (minimum) and 255 (maximum) speed.  |

#### Set/Query preset **speed** selection

AXIS<n[-m]>:**S**peed <speed>

#### Query if axis has been homed

AXIS<n[-m]>:ZERO?

## CONTROL SUBSET

### Move axis counterclockwise

AXIS<n>:**CCw**

AXIS<n>:**DN**

### Move axis clockwise

AXIS<n>:**CW**

AXIS<n>:**UP**

### Stop motion

AXIS<n[-m]>:**STop**

### Seek specified target

AXIS<n[-m]>:**SK**<target\_n>[,< target\_m>]

### Seek specified target in negative direction

AXIS<n[-m]>:**SKNegative** <target\_n>[,< target\_m>]

### Seek specified target in positive direction

AXIS<n[-m]>:**SKPositive** <target\_n>[,< target\_m>]

### Seek relative to the current position

AXIS<n[-m]>:**SKRelative** <target\_n>[,< target\_m>]

### Seek home sensor

AXIS<n[-m]>:**HOME**

### Toggle Scan Mode - move axis up and down between the soft limits

AXIS<n[-m]>:**SCAN**

## READ SUBSET

Query current position

AXIS<n[-m]>:**C**Position?

Response: **angle**

Query current motion **direction**

AXIS<n[-m]>:**D**IRection?

Response **0** → Not moving

Response **+1** → Moving clockwise

Response **-1** → Moving counter clockwise

Query if axis has been homed

AXIS<n[-m]>:**H**OME?

Response: **[0|1]**

This page intentionally left blank.

## Appendix A: Warranty

---



**Note:** See the *Product Information Bulletin* included with your shipment for the complete ETS-Lindgren warranty for your AMS-8040 Series.

### DURATION OF WARRANTIES FOR AMS-8040 SERIES

All product warranties, except the warranty of title, and all remedies for warranty failures are limited to the durations outlined below for each product.

Product Warranted	Duration of Warranty Period
AMS-8040 Series Antenna Measurement System, Anechoic Performance	5 Years
Filters	1 Year
Doors & Accessories	1 Year
Positioning Equipment	2 Years
Antennas	2 Years
Cables/connectors	1 Year

This page intentionally left blank.

## Appendix B: EC Declaration of Conformity

---



15



---

### EC Declaration of Conformity

---

**We, ETS-Lindgren Inc.,  
1301 Arrow Point Drive, Cedar Park, Texas, 78613, USA,  
declare under our sole responsibility that the product:**

**Product:** AMS-8040 Antenna Measurement System,  
AMS-8041 Antenna Measurement System

**Description:** It is a self-contained enclosure for making wireless device  
over-the-air performance and passive antenna pattern  
measurements.

**to which this declaration relates in conformity with the following European,  
harmonized and published standards at date of this declaration:**

**Directive(s):**

- ☒ Low Voltage Directive (LVD): 73/23/EEC and its amending directives
- ☒ Electromagnetic Compatibility Directive (EMC): 89/336/EEC and its  
amending directives

**Authorized Signature:**

---

Jim Psencik  
Vice President, Engineering  
ETS-Lindgren Inc.

March 25, 2015

---

Date of Issue